NASA Facts

National Aeronautics and Space Administration

Space Shuttle Rollout to the Launch Pad

When the Space Shuttle has completed stacking with its External Tank and Solid Rocket Boosters atop the Mobile Launcher Platform and completed checkout in the Vehicle Assembly Building (VAB), it is ready for rollout to the Launch Pad.

Space Shuttle Atlantis approaches the Fixed Service Structure on the launch pad in September 2002.

The journey to the launch pad via the Crawler-Transporter (CT) takes about six hours along the specially built road called the crawlerway. The crawlerway is almost as broad as an eight-lane turnpike. Two 40-foot-wide lanes are separated by a 50-foot-wide median strip.

The CT's maximum speed unloaded is 2 mph; loaded, it is 1 mph. The CT moves on eight tracked tread belts, each containing 57 tread belt "shoes." Each shoe is 7.5 feet long, 1.5 feet wide and weighs approximately 2,200 pounds. More than 1,000 shoes (456 per CT plus spares) were originally provided by Marion Power Shovel Co. when the CTs were initially built in 1965. New shoes were made by ME Global Manufacturing of Duluth, Minn., and installed in the fall 2004.

During the rollout, engineers and technicians on the CT, assisted by ground crews, operate and monitor systems while drivers steer the vehicle toward its destination.

During the rollout, approximately 30 crew members are on board to operate the

Crawler Transporter Facts

Height

Minimum (Cylinders retracted) .....20 feet
Maximum (Cylinders extended) .....26 feet

Size

Overall .....31 feet long /113 feet wide

Cylinders

Jacking Hydraulic (16 ea) .....20-inch diam.
Steering Hydraulic (16 ea).....14.5-inch diam.
Guide Tube (4 ea) .....40-inch diam.

Weight

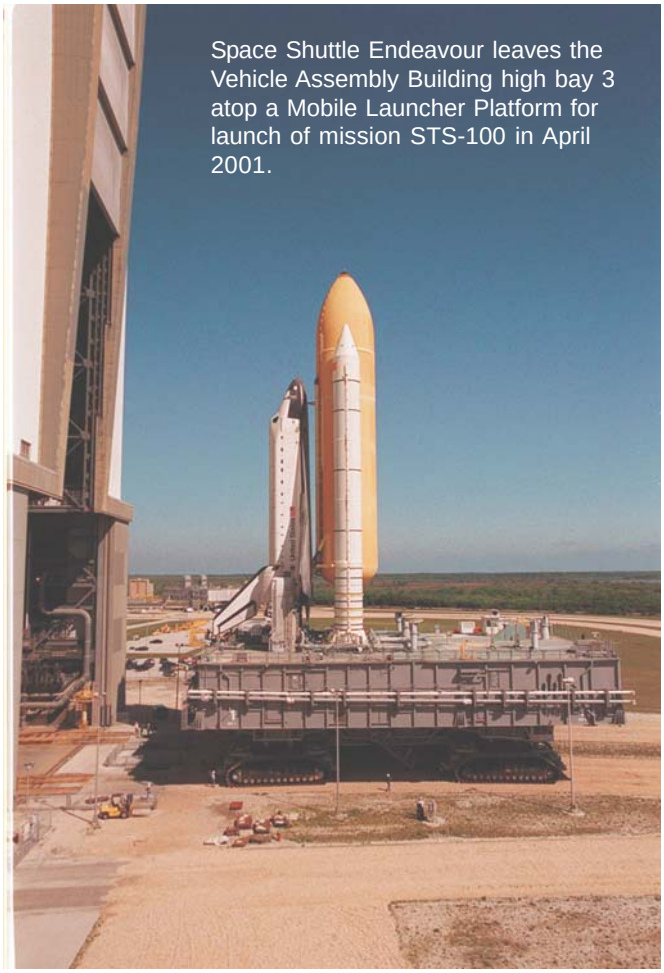
Overall .....5.5 million pounds
Chassis .....2.2 million pounds

Loads

MLP and Space Shuttle.....12 million pounds
MLP.....8.8 million pounds

Fuel

Diesel Capacity.....5,000 gallons
Consumption.....42 feet per gallon/ 125.7 gallons per mile



Space Shuttle Endeavour leaves the Vehicle Assembly Building high bay 3 atop a Mobile Launcher Platform for launch of mission STS-100 in April 2001.

crawler. Five of those 30 are engineers, including three drivers – a driver and backup in the forward cab and one driver in the rear cab; a JEL operator, who handles jacking, equalization and leveling operations; and a control room operator, who runs all the other systems on the crawler and communicates with the Launch Control Center. Nine engineers are cur-rently certified to drive the crawlers.

Inside the cab of crawler-transporter 2, the United Space Alliance driver takes the vehicle on a test run.

In addition to the engineers, two electricians handle power transfers between the crawler and the Mobile Launch Platform or the ground-based power, and two electronic technicians monitor the electronics in the control room. Also, there are four heavy equipment diesel mechanics in charge of the engines – start-up, shut-down and monitoring.

The balance of the crew comprises mechanics who monitor operations and aid in docking and jacking.

The CTs have a leveling system designed to keep the top of a Space Shuttle vehicle vertical within plus or minus 10 minutes of one degree of arc having the dimensions of a basketball. This system also provides the leveling operations required to negotiate the five-percent ramp leading to the launch pads and to keep the load level when it is raised and lowered on pedestals at the pad and in the VAB.

After the MLP is "hard down" on the launch pad pedestals, the crawler is backed down the ramp and returned to its parking area.

The end of rollout

Rollout concludes with final processing at the pad. Both Launch Pads 39A and 39B have permanent structures that enable the processing of a Space Shuttle for launch: the Fixed Service Structure (FSS) and the Rotating Service Structure (RSS).

The FSS provides access to the Space Shuttle orbiter and to the RSS. Located on the west side of the pad, the FSS is a 40-foot-square, cross-section steel structure that allows workers to reach various areas of the Shuttle. The FSS includes the hydrogen vent umbilical and intertank access arm, vehicle service lines (small helium and nitrogen lines and electrical cables), gaseous oxygen vent arm, and orbiter access arm for crew transfer to the orbiter.

The 130-foot-high RSS pivots 120 degrees from an open position to encircle an orbiter for changeout and servicing of the payload at the pad. Orbiter access platforms at five levels provide access to the payload bay with the payload bay doors open. The RSS allows the orbiter's payload bay doors to be open in the environmentally controlled Payload Changeout Room.

The RSS also provides access for servicing the Orbital Maneuvering System (OMS) pods. Hypergolic fluids are loaded into the pods through these servicing areas. Quick disconnects are used to provide fluid interfaces between the flight hardware and the ground support equipment.

Now the Shuttle is ready for launch. Kennedy Space Center, the home of the Space Shuttle, is making the Vision for Space Exploration a reality.